Zebra Z4M™/Z6M™ Printers
User's Guide

Customer order # 11356L
Manufacturer part # 11356LB Rev. 1

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- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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I have determined that the Zebra printers identified as the

Z4M™ and Z6M™

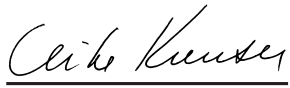
manufactured by:

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109 U.S.A.

have been shown to comply with the applicable technical standards of the FCC

for Home, Office, Commercial, and Industrial use

if no unauthorized change is made in the equipment,
and if the equipment is properly maintained and operated.



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Welcome

Hello!

- This user's guide provides all the information you need to operate the *Z*4M™ or *Z*6M™ printer.
- The *ZPL II® Programming Guide Volume I and Volume II* (part # 45540L) details how to create the perfect label format for your application. The guide explains how the optional ZBI™ extends the power of ZPL II by allowing custom programs to be written that operate within the printer, directly interfacing with bar code scanners, keyboard display devices, etc. The guide also contains information about the enhanced operating system features of your printer. There are three ways to obtain this guide: on the accessory CD-ROM (supplied with the printer), on our web site (www.zebra.com), or by ordering printed manuals from your distributor.
- The *ZebraNet® Networking: PrintServer II™ Installation and User's Guide* (part # 45537L) explains how you can quickly set up your printer on an IP network and experience ZebraLink™, our revolutionary real-time connectivity and control solution for Zebra printers (optional ZebraNet® PrintServer II required).
- The maintenance manual for your printer (part # 77259L) contains the information you need to maintain your printer.

Unpacking and Inspection

Carefully unpack and inspect the printer for shipping damage:

- Check all exterior surfaces.
- Raise the media access door and inspect the media compartment.

Save the carton and all packing material in case the printer needs to be shipped. Contact your authorized Zebra reseller for instructions.

Reporting Damage

If you discover shipping damage:

- Immediately notify the shipping company and file a damage report. *Zebra Technologies Corporation is not responsible for any damage incurred during the shipment of the equipment and will not repair this damage under warranty.*
- Keep the carton and all packing material for inspection.
- Notify your local Zebra reseller.

Storage

If you are not placing the printer into operation immediately, repackage it using the original packing materials. The printer may be stored under the following conditions:

- Temperature: –40° F to 140° F (–40° C to 60° C)
- Relative humidity: 5% to 85%, non-condensing

Media and Ribbon Requirements

Since print quality is affected by media and ribbon, printing speeds, and printer operating modes, it is very important to run tests for your applications.

We *strongly recommend* the use of Zebra Technologies Corporation-brand supplies for continuous high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the printer and to ensure against premature printhead wear.

- Continuous roll media, fanfold media, or card stock with optional perforations and registration holes may be used.
- Printhead life may be reduced by the abrasion of exposed paper fibers when using perforated media.
- The ribbon MUST be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear. (When printing in direct thermal mode, ribbon is not used and should not be loaded in the printer.)

Printer Power

The power supply in the printer automatically detects the applied line voltage and works in the 90 to 265 VAC range.

WARNING: For personnel and equipment safety, always use a three-prong plug with an earth ground connection.

NOTE: Depending on how your printer was ordered, a power cord may or may not be included. If one is not included, or if the one included is not suitable for your requirements, refer to "Power Line Cord Specifications" on page 85.

1. Make sure that the POWER switch (see Figure 1) is in the "off" (**O**) position before connecting the power cord.
2. Plug the female end of the power cord into the connector at the rear of the printer.
3. Plug the male end of the power cord into a live AC outlet.

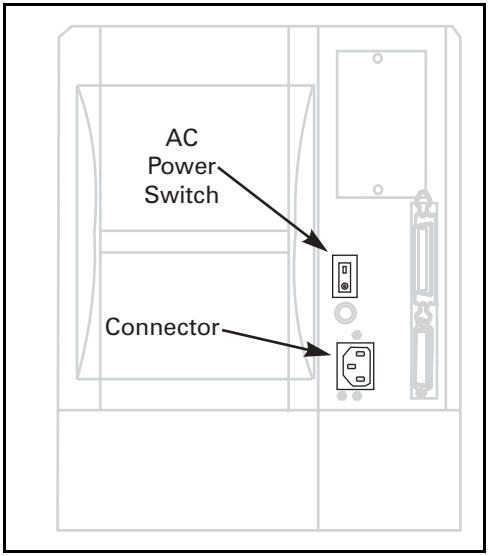


Figure 1

Printer Overview

Figure 2 shows the basic components of your printer. Depending on installed options, your printer may look slightly different.

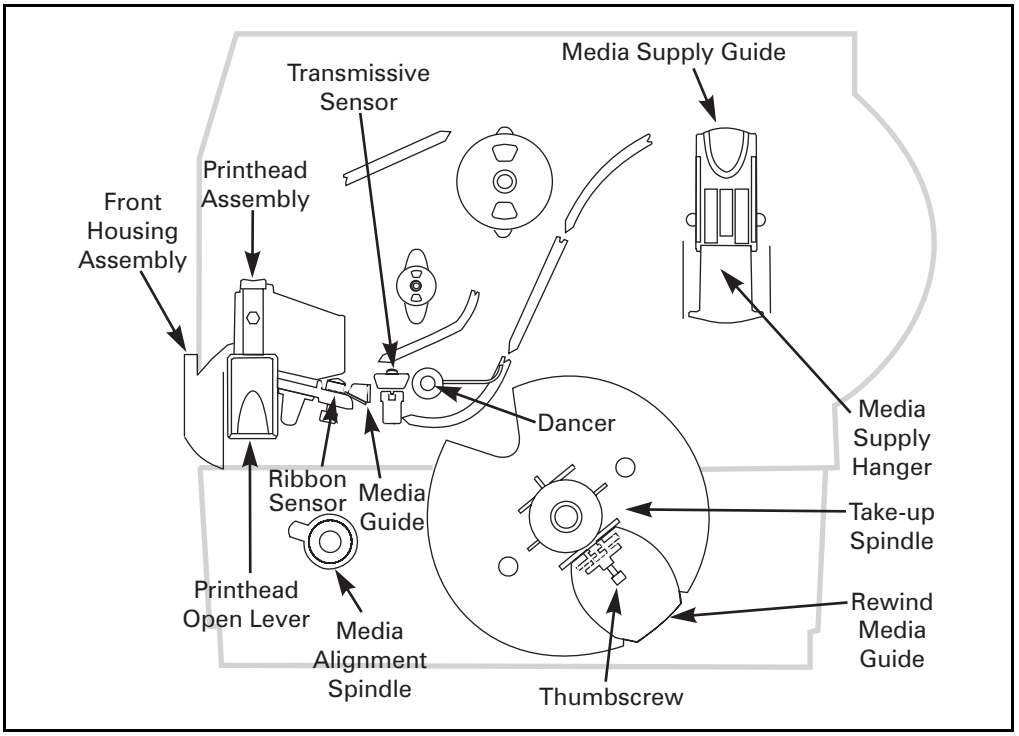


Figure 2

Calibrating the Printer

This chapter of the user's guide is *so* important that we've printed it on a different color paper! That way, it will be easy for you to find when you must calibrate (set up) the printer for your particular application.

Purpose

- To calibrate the printer.
- To verify that the printer is properly set up by printing a test label.

NOTE: This procedure must be performed when the printer is first installed or if it cannot properly detect the top of the label.

To calibrate the printer, you must perform the following procedures:

- Determine the **type of media** (labels) being used.
- Choose the **print method**.
- Position the **media sensor** (if necessary).
- **Configure the printer and software or driver** based on the label being used.
- Print a **test label**.

Types of Media

Non-Continuous Web Media

Non-continuous web media (refer to Figure 3) refers to individual labels that are separated by a gap, notch, or hole. When you look at the media, you can tell where one label ends and the next one begins.

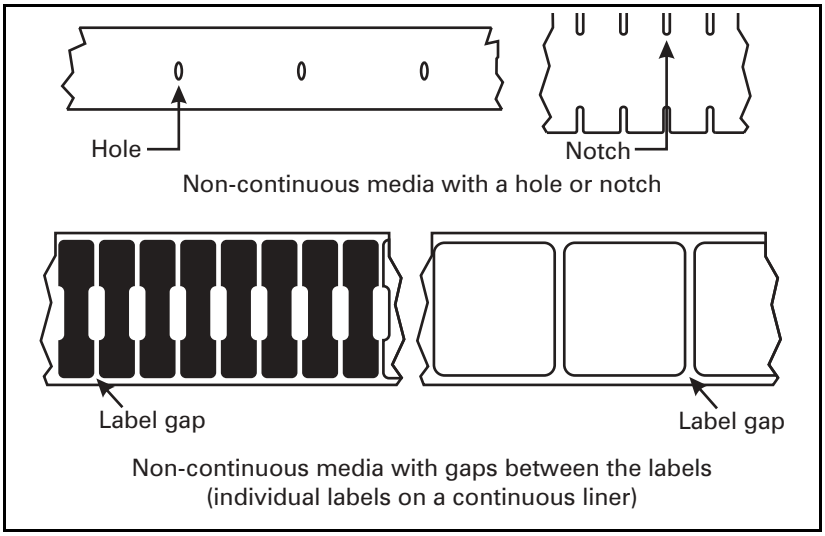


Figure 3

Non-Continuous Black Mark Media

Non-continuous black mark media has black marks printed on the back of the liner material that indicate the start and end of each label (refer to Figure 4).

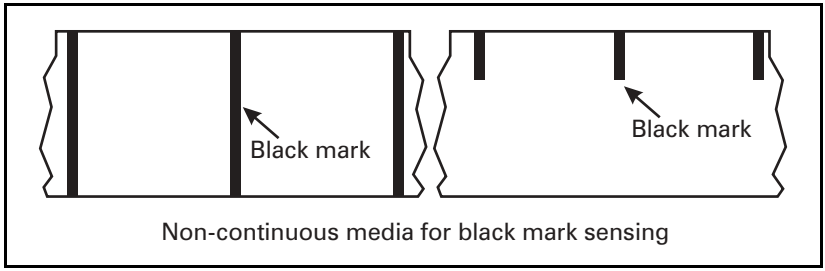


Figure 4

Continuous Media

Continuous media (refer to Figure 5) is one uninterrupted roll of material that allows the image to be printed anywhere on the label.

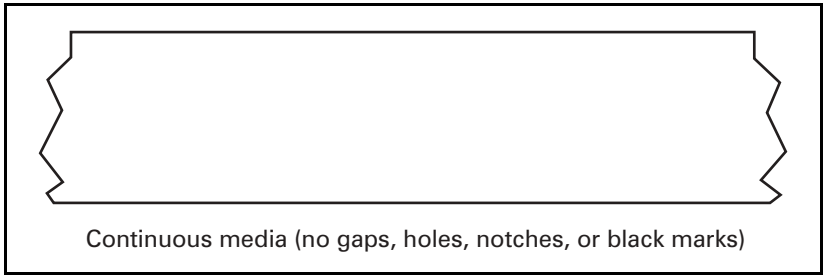


Figure 5

Choosing the Print Mode

- In **tear-off** mode, each label (or a strip of labels) can be torn off after it is printed.
- In **peel-off** mode, liner material is peeled away from the label as it is printed. After this label is removed from the printer, the next one is printed.
- In **cutter** mode, the printer automatically cuts the label after it is printed.
- In **rewind** mode, the media and/or liner are rewound onto a core as the labels are printed.

Loading the Media

Figure 6 illustrates one method of media loading. For more detailed instructions, as well as information about how to load the different types of media and the various printing modes, refer to the instructions that begin on page 22.

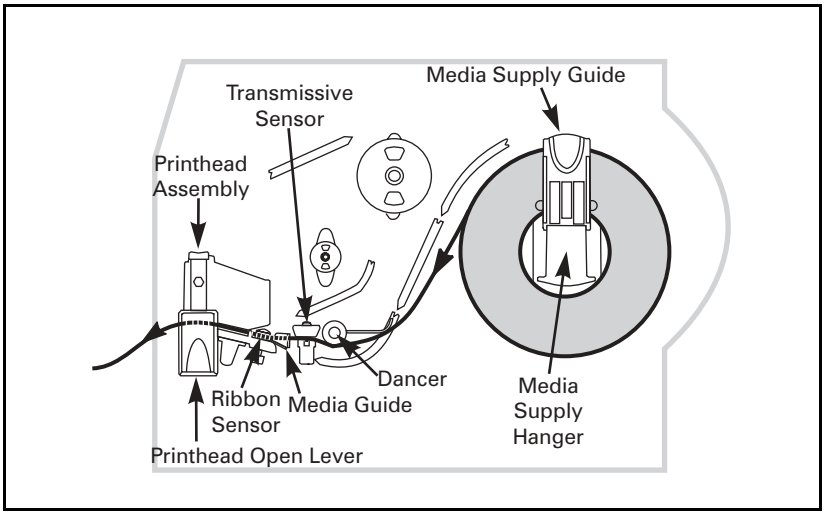


Figure 6

Positioning the Media Sensor

The correct positioning of the media sensor is important — it can make the difference between a perfect label and a call to Technical Support!

There are two media sensors in this printer: "reflective" and "transmissive."

Reflective Sensor

The reflective sensor detects the "start-of-label indicator" (the notch, hole, black mark, or gap between die-cut labels).

The reflective sensor must be positioned:

- directly under the notch, hole, or black mark, or
- anywhere along the width of the media if there is a gap between labels

The glow of the red light through the media helps you to accurately position the reflective sensor.

NOTE: If you are using continuous media, position the reflective sensor anywhere under the media so that the printer can detect an out-of-paper condition.

NOTE: The reflective sensor is compatible with most types of media. However, if you encounter difficulties with calibration, use the transmissive sensor. For details, see "Transmissive Sensor" on page 10.

Adjusting the Reflective Sensor

Refer to Figure 7.

1. Open the printhead assembly by pressing the printhead open lever.
2. Locate the reflective sensor positioning lever.
3. Move the reflective sensor positioning lever across the width of the media until the reflective sensor aligns with the start-of-label indicator. The glow of the red light assists in the proper placement of the reflective sensor.
4. Close the printhead assembly.

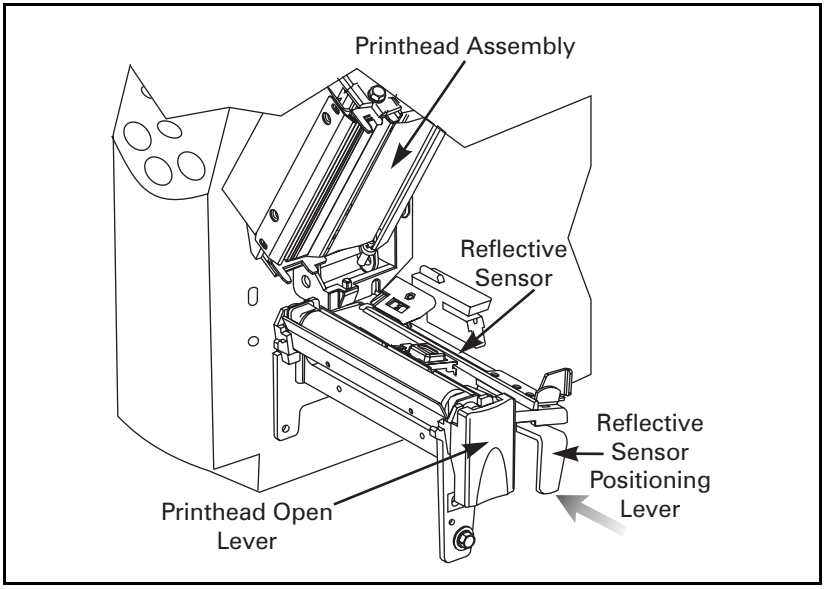


Figure 7

Transmissive Sensor

The transmissive sensor is in a fixed position and enabled via the front panel (refer to “SENSOR SELECT” on page 41 for details).

Loading the Ribbon

Refer to Figure 8.

For more detailed information, refer to the instructions that begin on page 34.

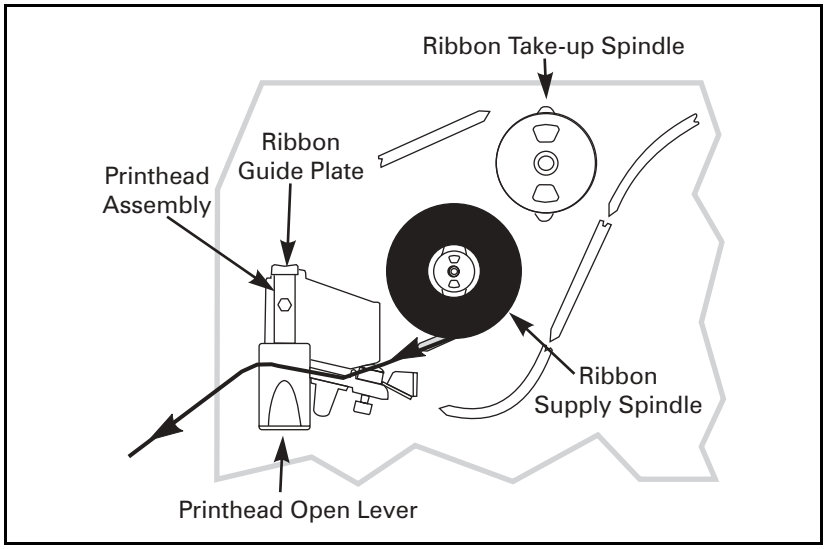


Figure 8

Auto Calibration

During auto calibration, the printer determines the label length and media/ribbon sensor settings.

Auto calibration occurs when the printer is turned on and each time the printer recovers from an error condition. (To clear an error, open and close the printhead assembly and then press the PAUSE key.) The printer begins auto calibration when all errors have been cleared.

The results of the auto calibration are stored in the printer's memory and are retained even if printer power is removed. These parameters remain in effect until the next calibration is performed.

NOTE: The auto calibration process does not take place if the ZPL command or front panel setting for "MEDIA POWER UP" or "HEAD CLOSE" is set either to "feed" or "no motion." In these cases, the printer assumes the media is correctly positioned and starts printing without auto calibrating.

Operator Controls

POWER Switch

The POWER switch is located at the back of the printer above the power cord. Turn on the printer.

Front Panel

For a more detailed explanation of the front panel keys and lights (shown in Figure 9), refer to the instructions that begin on page 19.

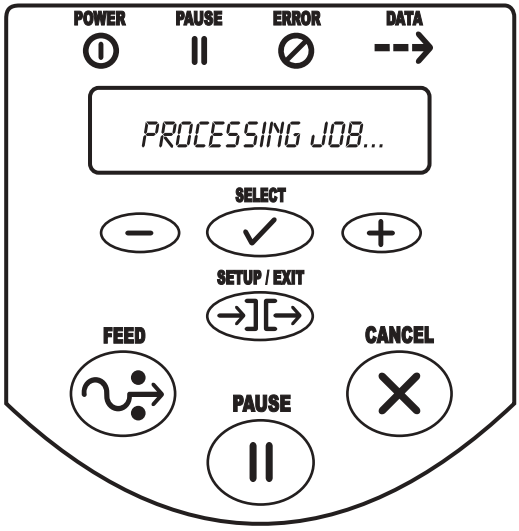


Figure 9

Configuring the Printer

The configuration procedure in Table 1 contains the information you need to get your printer up and running, *but it is not comprehensive*. Refer to page 37 for more information.

1. Press the SETUP/EXIT key at the "PRINTER READY" display to enter the configuration mode.

NOTE: You need to press the INCREMENT (+) key more than once to advance to some of the displays.

2. Press the INCREMENT (+) or DECREMENT (–) key to scroll to the setting you wish to change.
3. Press the SELECT key to toggle the functionality of the INCREMENT (+) and DECREMENT (–) keys.
4. Press the INCREMENT (+) or DECREMENT (–) keys to increase or decrease the value; answer "yes" or "no"; print a label; or select the digit you wish to change.
5. Press the SELECT key again to use the INCREMENT (+) and DECREMENT (–) keys to scroll to the desired menu item.

Table 1

Parameter	Selections/Explanation
PRINTER READY	You are ready to configure the printer
DARKNESS	0 to 30 (default setting is "10")
PRINT MODE	Tear-off, peel-off, liner take-up, cutter, rewind (default setting is tear-off)
MEDIA TYPE	Non-continuous, continuous (default setting is "non-continuous")
SENSOR TYPE	Web, mark (default setting is "web")
PRINT METHOD	Thermal transfer, direct thermal (default setting is "thermal transfer")

6. After you have configured the print method, press the SETUP/EXIT key to save the changes and exit the configuration mode.

Configuring the Software or Printer Driver

Many printer settings may also be controlled by your printer's driver or label preparation software. Refer to the driver or software documentation for more information.

Printing a Test Label

To print a test label:

1. Turn off the printer.
2. Press and hold the CANCEL key while turning on the printer.
3. Release the CANCEL key after the DATA light turns off (approximately five seconds).

A configuration label prints showing the printer's currently stored parameters (similar to the labels shown in Figure 10).

If you encounter any problems while you are configuring the printer or printing a test label, refer to "Troubleshooting" beginning on page 69. Otherwise, refer to See "Establishing Communication" beginning on page 17 to set up the communication parameters.

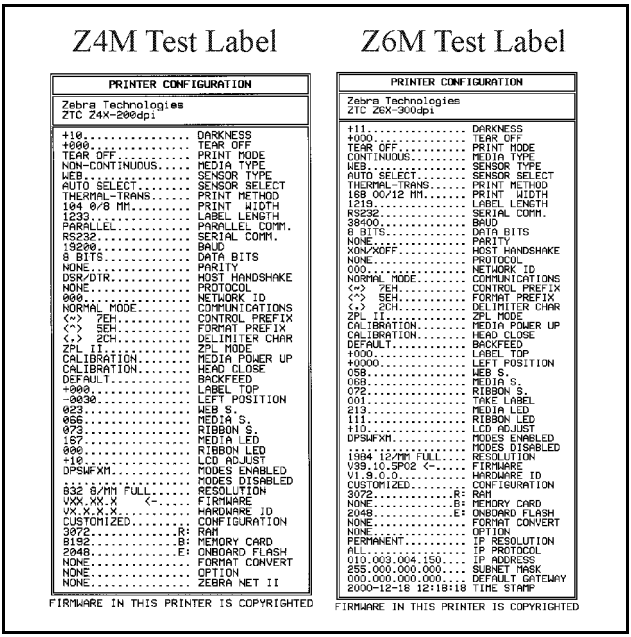


Figure 10

Establishing Communication

System Considerations

Interfaces

The method of interfacing this printer to a data source depends on the communication options installed in the printer. The standard interfaces are an RS-232/RS-422/RS-485 serial data port and an IEEE 1284 compliant bi-directional parallel port. The optional ZebraNet® PrintServer II enables printers to be connected to 10Base-T Ethernet networks.

Data Specifications

When communicating via an asynchronous serial data port (refer to Figure 11), the baud rate, number of data and stop bits, parity, and handshaking are user selectable (default settings are 9600 baud, 8 data bits, 1 stop bit, no parity, and XON/XOFF). Parity only applies to data transmitted by the printer since the parity of received data is ignored. Refer to page 46 to configure the communication parameters for the printer. The values selected must be the same as those used by the host equipment connected to the printer.

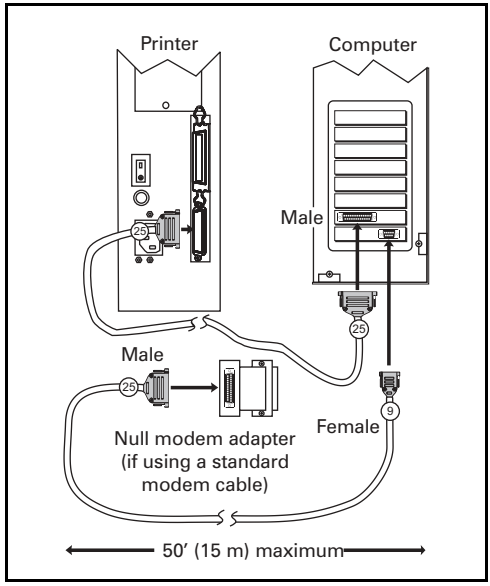


Figure 11

When communicating via the parallel port (refer to Figure 12), the previously mentioned parameters are not considered.

For serial and parallel pinout and technical information, refer to “Appendix” beginning on page 87.

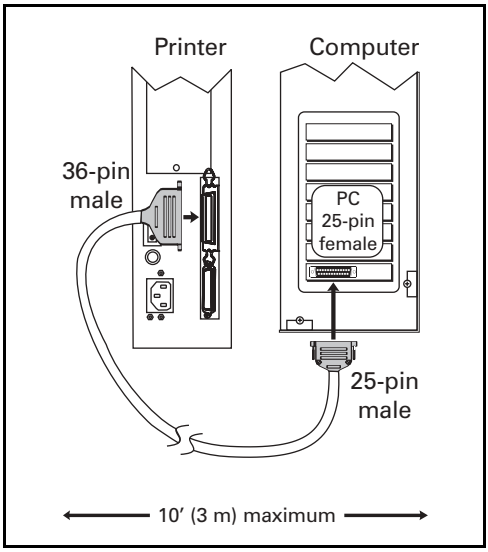


Figure 12

Cabling Requirements

Data cables must be fully shielded and fitted with metal or metalized connector shells. Shielded cables and connectors are required to prevent radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible.
- Do not bundle the data cables tightly with the power cords.
- Do not tie the data cables to power wire conduits.

NOTE: Zebra printers comply with FCC “Rules and Regulations,” Part 15, for Class B Equipment, using fully shielded data cables. Use of unshielded cables may increase radiated emission above the Class B limits.

NOTE: RS-422 and RS-485 applications should use twisted shielded pairs as recommended in the Appendix of the TIA/EIA.-485 Specification.

Front Panel

This section discusses the functions of the controls and indicators on the printer. Become familiar with each of these functions before operating the printer.

Front Panel Display

The front panel display (shown in Figure 13) communicates operational status and programming modes and parameters.

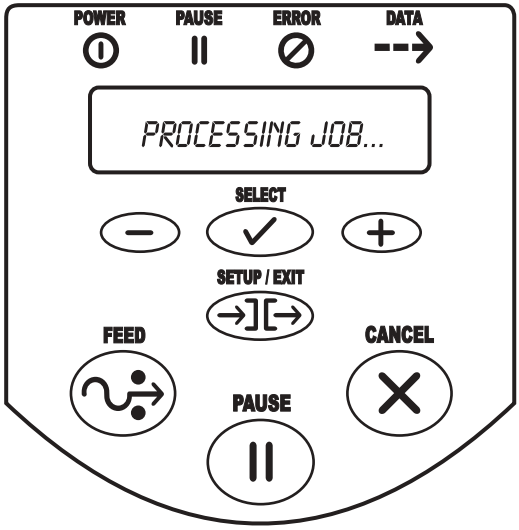


Figure 13

Front Panel Keys

Key	Function
FEED	Forces the printer to feed one blank label each time the key is pressed. • Printer not printing: one blank label immediately feeds. • Printing: one blank label feeds after the current batch of labels is complete.
PAUSE	Starts and stops the printing process: • Printer not printing: no printing occurs. (Press PAUSE again to resume printing.) • Printing: printing stops after the current batch is complete.
CANCEL	When in the pause mode, this key cancels print jobs. • Printer not printing: the next stored label format does not print. • Printing: the label format currently printing is cancelled. Press and hold for several seconds to cancel all print jobs in the printer's memory.
SETUP/EXIT	Enters and exits the configuration mode.
SELECT	Toggles the function of the INCREMENT (+) and DECREMENT (–) keys between the "scroll" and "change" modes. • Press once to use the INCREMENT (+) and DECREMENT (–) keys to change the values of the selection. • Press again to use the INCREMENT (+) and DECREMENT (–) keys to scroll through the menu items.
INCREMENT (+) ("scroll mode")	Scrolls to the next selection.
INCREMENT (+) ("change mode")	• Increases the value • Answers "yes" • Prints a label (when applicable)
DECREMENT (–) ("scroll mode")	Scrolls to the previous selection.
DECREMENT (–) ("change mode")	• Decreases the value • Selects the digit you wish to change • Answers "no"

Front Panel Lights

Light	Status	Indication
POWER	Off	The printer is off or no power is applied.
	On	The printer is on.
PAUSE	Off	Normal printer operation.
	On	The printer has stopped all printing operations.
	Flashing	In peel-off mode, the PAUSE light flashes when the label is available for removal, and when initializing FLASH or PCMCIA memory.
ERROR	Off	Normal printer operation (no errors).
	Slow flashing	“RIBBON IN” warning, “HEAD UNDER TEMP” warning, or “HEAD OVER TEMP” error.
	Fast flashing	“HEAD OPEN” error.
	On	“PAPER OUT”, “RIBBON OUT”, or “CUTTER JAM” errors.
DATA	Off	Normal printer operation (no data being received or processed).
	One flash	The CANCEL key is pressed and a format is successfully cancelled.
	Slow flashing	The printer is unable to accept more data from the host.
	Fast flashing	The printer is receiving data.
	On	A partial format has been received and there has been no subsequent data activity.

Roll Media Loading

Tear-off Mode

Refer to Figure 14.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and out the front of the printer.
8. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
9. Close the printhead assembly.
10. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

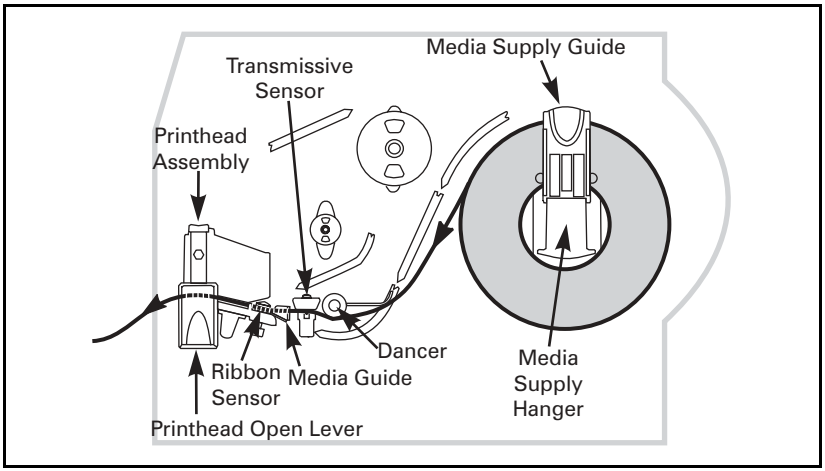


Figure 14

Cutter Mode

(Cutter option required)

Refer to Figure 15.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and through the cutter module.
8. Ensure that the media is against the back of the transmissive sensor. Then, slide in the media guide so that it just touches, but does not restrict, the edge of the media.
9. Close the printhead assembly.
10. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

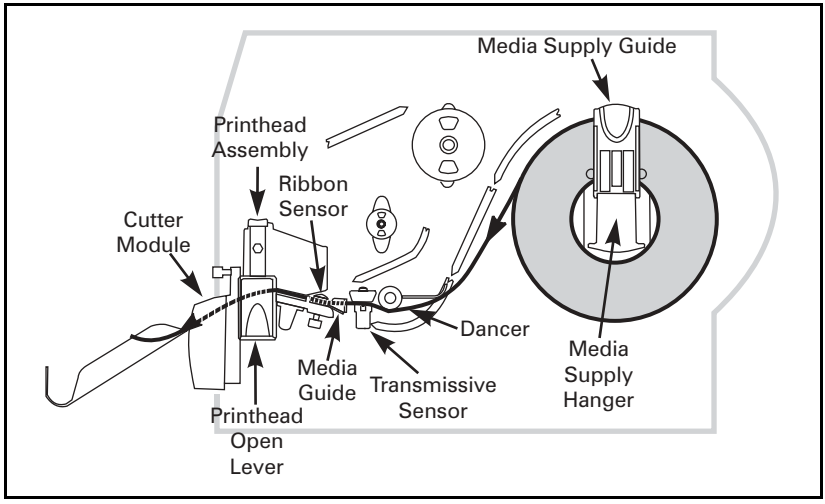


Figure 15

Value Peel-off Mode

(Value peel-off option required)

Refer to Figure 16.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and through the cutter module.
8. Pull approximately 12" (305 mm) of media through the front of the printer.
9. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
10. Pull down the value peel lever to open the value peel assembly.
11. Feed the liner over the tear-off/peel-off bar and behind the value peel assembly.
12. Close the printhead assembly.
13. Close the value peel assembly using the value peel lever.
14. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

Peeling starts automatically. Press the FEED key to test.

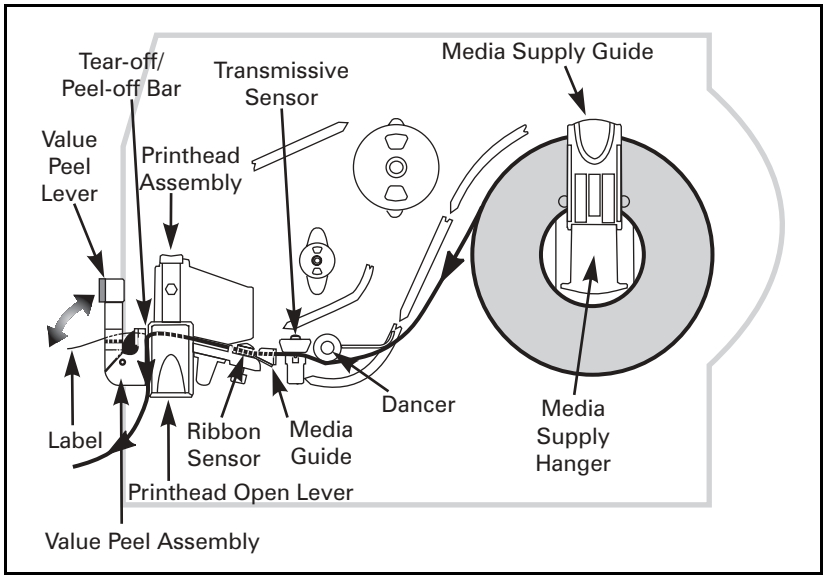

Tear-off/
Peel-off Bar
Transmissive
Sensor
Media Supply Guide
Value
Peel
Lever
Printhead
Assembly
Dancer
Media
Supply
Hanger
Label
Ribbon
Sensor
Media
Guide
Printhead Open Lever
Value Peel Assembly

Figure 16

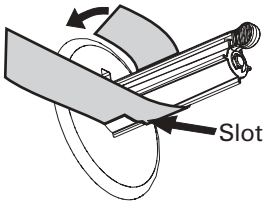
Liner Take-up Mode

(Liner take-up option required)

NOTE: This option is available on the Z4M printer only.

Refer to Figure 17.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, and under the ribbon sensor.
8. Pull approximately 18" (500 mm) of media through the front of the printer.
9. Remove the labels from the exposed media so that only the liner remains.
10. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
11. Pull down the value peel lever to open the value peel assembly.
12. Feed the media over the tear-off/peel-off bar and behind the value peel assembly.
13. Close the printhead assembly.
14. Close the value peel assembly using the value peel lever.
15. Slide the liner into the slot (see inset) in the spindle of the liner take-up (as shown in Figure 17). Make sure the liner is resting against the back plate of the spindle assembly.
16. Turn the spindle assembly counterclockwise a few times so that the liner is snug.



17. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

Peeling starts automatically. Press the FEED key to test.

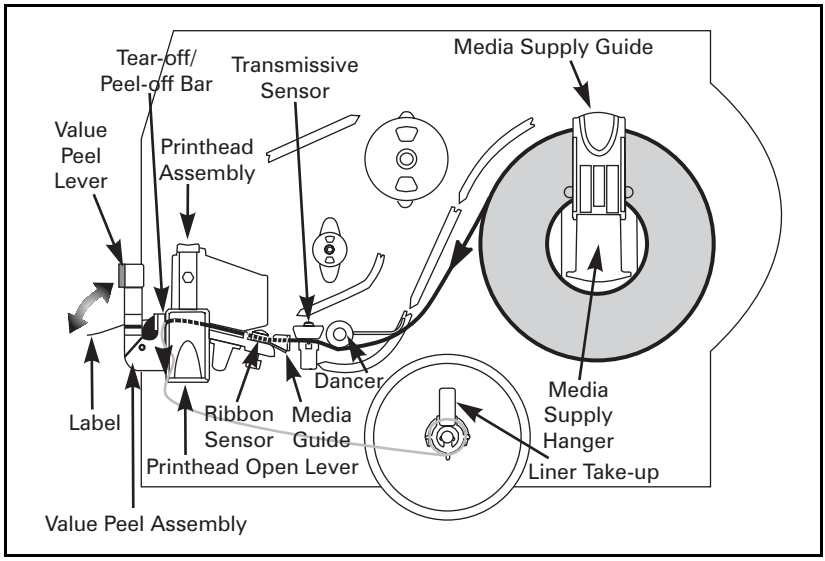
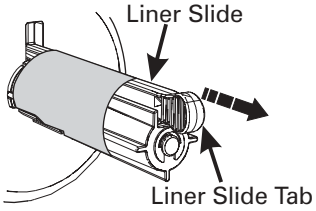


Figure 17

Liner Removal

1. Pull the liner slide toward you (see inset) until it stops (about a third of the way down the liner take-up spindle).
2. Slide the liner from the take-up spindle.



NOTE: The liner slide moves smoothly back into place on the liner take-up spindle once the liner has been removed.

Power Peel/Rewind (Peel Mode)

(Power peel/rewind option required)

Refer to Figure 18.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, and under the ribbon sensor.
8. Pull approximately 36" (915 mm) of media through the front of the printer.
9. Remove the labels from the first 18" of media so that only the liner remains.
10. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
11. Pull down the value peel lever to open the value peel assembly.
12. Feed the media over the tear-off/peel-off bar, and through the slot in the value peel assembly.
13. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
14. Slide an empty core onto the take-up spindle; wrap the liner around the core and turn the take-up spindle counterclockwise to wind up the excess liner material.

NOTE: The liner must be attached to the take-up spindle for the printer to operate properly. Make sure the edge of the liner is flush against the backplate of the take-up spindle (see “Rewind Media Alignment” on page 67 for details).

15. Slide the rewind media guide against the liner material and tighten the thumbscrew to lock it into position.

16. Close the printhead assembly.

17. Close the value peel assembly using the value peel lever.

18. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

Peeling starts automatically. Press the FEED key to test.

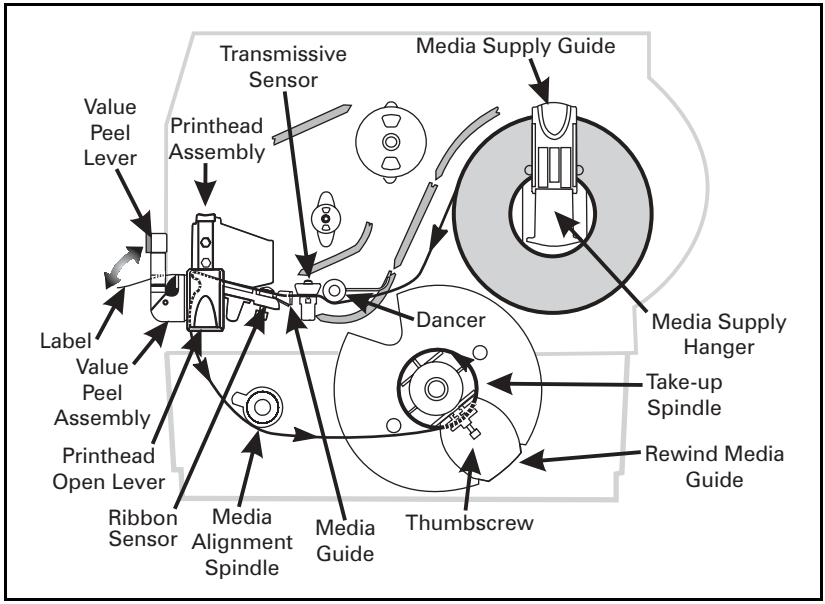


Figure 18

Liner Removal

1. Cut the liner material between the media alignment spindle and the take-up spindle.
2. Rotate the take-up spindle counterclockwise until the rewind media guide is in the "12 o'clock" position.
3. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
4. Slide the core with the liner material from the take-up spindle.

Power Peel/Rewind (Rewind Mode)

(Power rewind option required)

Refer to Figure 19.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, and under the ribbon sensor.
8. Pull approximately 36" (915 mm) of media through the front of the printer.
9. Remove the labels from the first 18" of media so that only the liner remains.
10. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
11. Feed the media over the value peel assembly and through the rewind base assembly.
12. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
13. Slide an empty core onto the take-up spindle; wrap the media around the core and turn the take-up spindle counterclockwise to wind up the excess material.

NOTE: The liner must be attached to the take-up spindle for the printer to operate properly. Make sure the edge of the liner is flush against the backplate of the take-up spindle (see “Rewind Media Alignment” on page 67 for details).

14. Slide the rewind media guide against the media, and tighten the thumbscrew to lock it into position.

15. Close the printhead assembly.

16. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

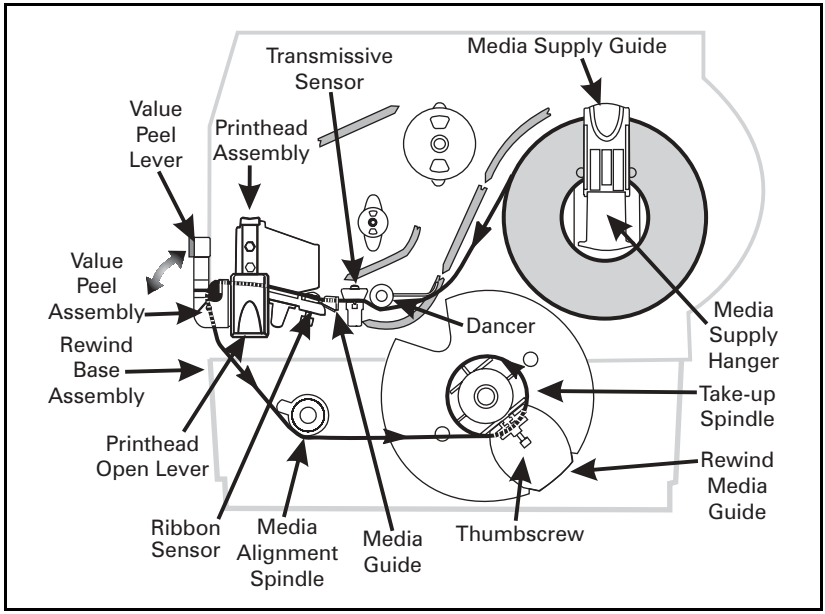


Figure 19

Media Removal

1. Cut the media between the media alignment spindle and the take-up spindle.
2. Rotate the take-up spindle counterclockwise until the rewind media guide is in the "12 o'clock" position.
3. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
4. Slide the core with the roll of media from the take-up spindle.

Fanfold Media Loading

Fanfold media feeds through either the bottom or rear access slot.

Refer to Figure 20.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Pass the fanfold media over the media supply hanger.
5. Flip up the media supply guide. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the media.
6. Thread the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and out the front of the printer.
7. Ensure that the media is against the back of the transmissive sensor. Then, slide in the media guide so that it just touches, but does not restrict, the edge of the media.
8. Close the printhead assembly.

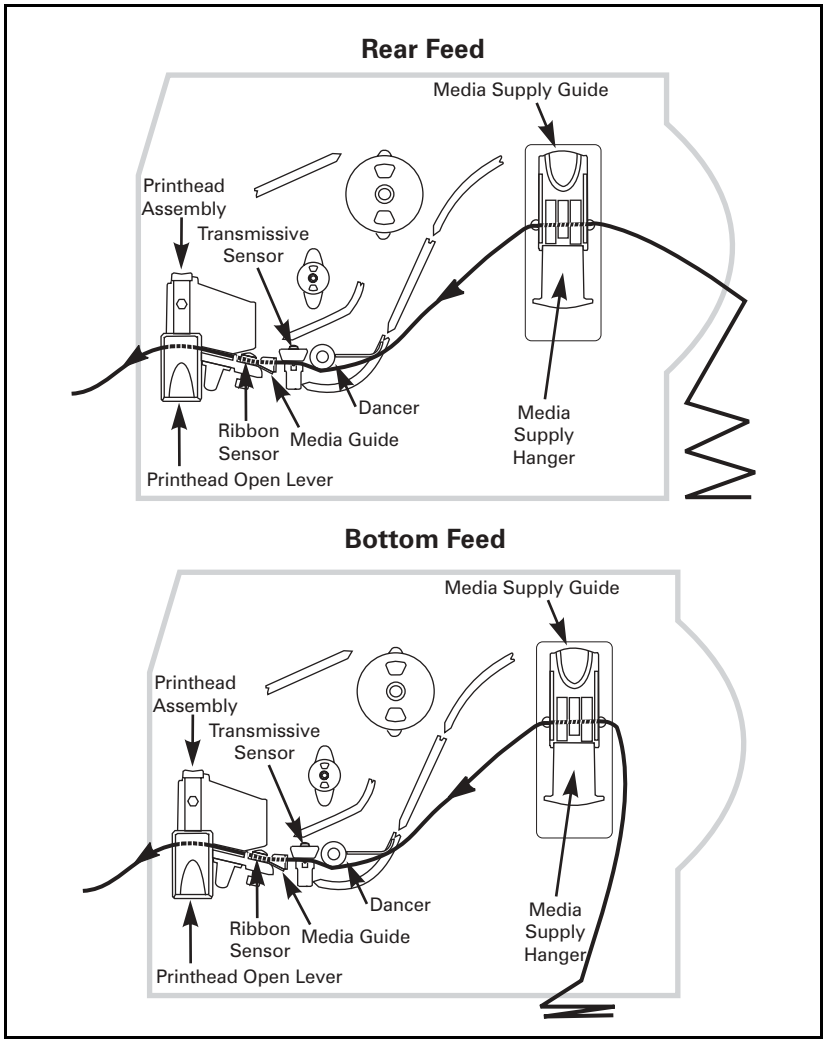

Rear Feed
Media Supply Guide
Printhead Assembly
Transmissive Sensor
Dancer
Media Supply Hanger
Ribbon Sensor
Media Guide
Printhead Open Lever
Bottom Feed
Media Supply Guide
Printhead Assembly
Transmissive Sensor
Dancer
Media Supply Hanger
Ribbon Sensor
Media Guide
Printhead Open Lever

Figure 20

Ribbon Loading

NOTE: The ribbon supply spindle in your printer is a “dual tension” variety. Most applications require the spindle to be in the “normal” position. The “low tension” position is recommended only when a wide ribbon is used and normal tension hampers the ribbon movement.

NOTE: To place this spindle in the “normal” position, firmly pull out the spindle end cap until it clicks into place as shown in Figure 21. To place the spindle in the “low tension” position, firmly push in the end cap until it clicks into place.

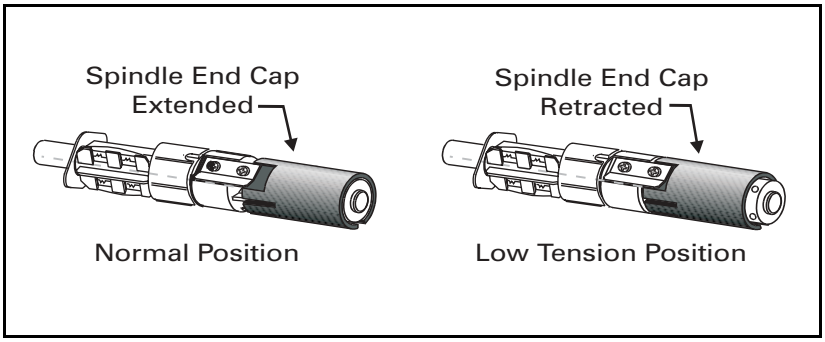


Figure 21

Loading the Ribbon

CAUTION: Always use ribbon that is wider than the media. The smooth liner of the ribbon protects the printhead from wear. (For direct thermal printing, do not load ribbon in the printer.)

Refer to Figure 22.

1. Press the printhead open lever. The printhead assembly springs up.
2. Orient the ribbon as shown. Push the ribbon roll completely onto the ribbon supply spindle.
3. Pull the end of the ribbon over the ribbon sensor, under the printhead assembly, and out the front of the printer.
4. Hold the ribbon snug and free of wrinkles and in line with the guide mark near the left edge of the ribbon guide plate. Close the printhead assembly.
5. Wind the ribbon clockwise onto the ribbon take-up spindle.

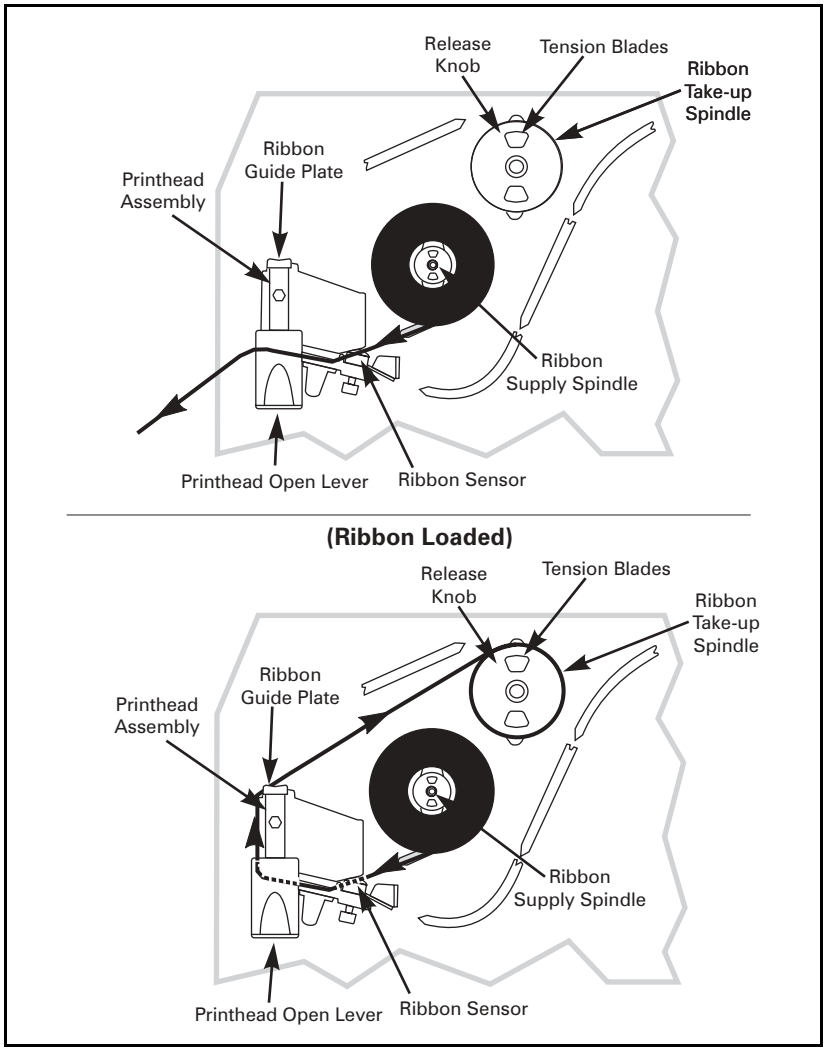

Release Knob
Tension Blades
Ribbon Take-up Spindle
Ribbon Guide Plate
Printhead Assembly
Ribbon Supply Spindle
Printhead Open Lever
Ribbon Sensor
(Ribbon Loaded)
Release Knob
Tension Blades
Ribbon Take-up Spindle
Ribbon Guide Plate
Printhead Assembly
Ribbon Supply Spindle
Printhead Open Lever
Ribbon Sensor

Figure 22

Ribbon Removal

To remove the ribbon:

1. If the ribbon has not run out, break it between the ribbon guide plate and the ribbon take-up spindle.
2. While turning the ribbon take-up spindle release knob counterclockwise, squeeze the ribbon against the ribbon take-up spindle tension blades.
3. When the tension blades collapse into the ribbon take-up spindle, hold the release knob and rotate the spent ribbon toward the rear of the printer. Then, slide off the ribbon.

Configuration

After you have installed the media and ribbon and the Power-On Self Test (POST) is complete, the front panel display shows “PRINTER READY.” (If the printer fails its POST, refer to page 75.) Use the front panel display and the four keys directly below it to set printer parameters for your application.

NOTE: Printers operating on an IP network can be quickly configured using ZebraLink™ WebView (optional ZebraNet® PrintServer II required). For information, refer to *ZebraNet Networking: PrintServer II Installation and User’s Guide*.

NOTE: Unless otherwise noted, all parameters are listed in the order they are displayed, starting with “DARKNESS.”

Entering the Setup Mode

To enter the programming mode, press the SETUP/EXIT key.

- Press the INCREMENT (+) or DECREMENT (–) key to scroll to the setting you wish to change.
- Press the SELECT key to toggle the functionality of the INCREMENT (+) and DECREMENT (–) keys.
- Press the INCREMENT (+) or DECREMENT (–) keys to increase or decrease the value; answer “yes” or “no”; print a label; or select the digit you wish to change.
- Press the SELECT key again to use the INCREMENT (+) and DECREMENT (–) keys to scroll to the desired menu item.

NOTE: An asterisk (*) in the upper left-hand corner of the display indicates that the value displayed is different than the currently stored value.

Changing Password-Protected Parameters

Certain parameters are password protected by factory default.

NOTE: You have the option of making *all* parameters password protected. See "PASSWORD LEVEL" on page 52 for details.

CAUTION: Do not change password-protected parameters unless you are sure you know what you are doing! If set incorrectly, these parameters could cause the printer to function in an unpredictable way.

The first attempt to change a password-protected parameter requires you to enter a four-digit password at the "ENTER PASSWORD" display. The DECREMENT (–) key changes the selected digit position. The INCREMENT (+) key increases the selected digit value. After entering the password, press the SELECT key. The parameter you wish to change is displayed. If the password was entered correctly, you can now change the value.

The default password value is 1234. The password can be changed using the **^KP** (Define Password) ZPL II instruction.

NOTE: Once the password has been entered correctly, it does not have to be entered again unless you leave and re-enter the programming mode using the SETUP/EXIT key.

NOTE: You can disable the password protection feature so that it no longer prompts you for a password by setting the password to ØØØØ via the **^KPØ** ZPL/ZPL II command. To re-enable the password-protection feature, send the ZPL/ZPL II command **^KPx**, where "x" can be any number that is one to four digits in length, except Ø.

Leaving the Setup Mode

You can leave the program mode at any time by pressing the SETUP/EXIT key. The "SAVE CHANGES" display appears. There are five choices, which are described below. Pressing the INCREMENT (+) or DECREMENT (–) key displays other choices and pressing the SELECT key selects the displayed choice.

- PERMANENT — Permanently saves the changes. Values are stored in the printer even when power is turned off.
- TEMPORARY — Saves the changes until you change them again or until power is turned off.
- CANCEL — Cancels all changes from the time you pressed the SETUP/EXIT key except for darkness and tear-off settings (if they were changed).
- LOAD DEFAULTS — Loads factory defaults.
- LOAD LAST SAVE — Loads values from the last permanent save.

Configuration and Calibration Sequence

Display Shows	Action/Explanation
PRINTER READY	Normal printer operation.
Setting Print Parameters	
DARKNESS	**Adjusting Print Darkness:** Press the INCREMENT (+) key to increase darkness. Press the DECREMENT (–) key to decrease darkness. **Default:** +10 **Range:** 0 to +30 Darkness settings are dependent upon a variety of factors, including ribbon type, media, and the condition of the printhead. You may adjust the darkness for consistent high-quality printing. If printing is too light, or if there are voids in printed areas, increase the darkness. If printing is too dark, or if there is spreading or bleeding of printed areas, decrease the darkness. The FEED Key Self Test on page 78 can also be used to determine the best darkness setting. Since the darkness setting takes effect immediately, you can see the results on labels that are currently printing. **CAUTION:** Set the darkness to the lowest setting that provides good print quality. Darkness set too high may cause ink smearing and/or it may burn through the ribbon. Darkness settings may also be changed by the driver or software settings.
TEAR OFF	**Adjusting the Tear-off Position:** Press the INCREMENT (+) key to increase the value, press the DECREMENT (–) key to decrease the value. Each press of the key adjusts the tear-off position by four dot rows. **Default:** +0 **Range:** –120 to +120 This parameter establishes the position of the media over the tear-off/peel-off bar after printing. The label and liner can be torn off or cut between labels.

Display Shows	Action/Explanation
PRINT MODE	**Selecting Print Mode:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Tear-off **Selections:** Tear-off, cutter, peel-off, liner take-up, rewind Print mode settings tell the printer the method of media delivery that you wish to use. Be sure to select a print mode that your hardware configuration supports as some selections displayed are for optional printer features.
MEDIA TYPE	**Setting Media Type:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Continuous **Selections:** Continuous, non-continuous This parameter tells the printer the type of media you are using. Selecting continuous media requires that you include a label length instruction in your label format (**^LLxxxx** if you are using ZPL or ZPL II). When non-continuous media is selected, the printer feeds media to calculate label length (the distance between two detections of the inter-label gap, webbing, or alignment notch or hole).
SENSOR TYPE	**Setting the Sensor Type:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Web **Selections:** Web, mark This parameter tells the printer whether you are using media with a web (gap/space between labels, notch, or hole) to indicate the separation between labels or if you are using media with a black mark printed on the back. If your media does not have black marks on the back, leave your printer at the default setting (web).
SENSOR SELECT	**Setting the Sensor Select:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Auto select **Selections:** Auto select, reflective, transmissive This parameter tells the printer the sensor you wish to use. “Auto select” is compatible with most types of media. However, if you encounter difficulties with calibration, refer to “Types of Media” on page 6 to help you choose the appropriate sensor for your media. (Select the reflective sensor with either continuous or non-continuous black mark media; choose the transmissive sensor if you are using non-continuous web media.)

Display Shows	Action/Explanation
PRINT METHOD	**Selecting Print Method:** Press the INCREMENT (+) key for the next value; press the DECREMENT (–) key for the previous value. **Default:** Thermal transfer **Selections:** Thermal transfer, direct thermal The print method parameter tells the printer the method of printing you wish to use: direct thermal (no ribbon) or thermal transfer (using thermal transfer media and ribbon). **NOTE:** Selecting direct thermal when using thermal transfer media and ribbon creates a warning condition, but printing continues.
PRINT WIDTH	**Setting Print Width:** Press the INCREMENT (+) key to increase the value, press the DECREMENT (–) key to decrease the value. To change the unit of measurement, press the DECREMENT (–) key until the unit of measurement is active, then press the INCREMENT (+) key to toggle to a different unit of measure (inches, mm, or dots). **Default; Range:** The default and range of acceptable values may vary depending on what printer you have. Refer to “Printing Specifications” on page 82 for further information about the ranges available for your model. Print width determines the printable area across the width of the label.

Listing Printer Information	
Display Shows	**Action/Explanation**
LIST FONTS	**List Fonts:** Press the INCREMENT (+) key to print a label listing all of the available fonts. This selection is used to print a label that lists all of the fonts currently available in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM, FLASH memory, font EPROMs, or font cards.
LIST BAR CODES	**List Bar Codes:** Press the INCREMENT (+) key to print a label listing all of the available bar codes. This selection is used to print a label that lists all of the bar codes currently available in the printer.
LIST IMAGES	**List Images:** Press the INCREMENT (+) key to print a label listing all of the available images. This selection is used to print a label that lists all of the images currently stored in the printer's RAM, FLASH memory, optional EPROM, or optional memory card.
LIST FORMATS	**List Formats:** Press the INCREMENT (+) key to print a label listing all of the available formats. This selection is used to print a label that lists all of the formats currently stored in the printer's RAM, FLASH memory, optional EPROM, or optional memory card.
LIST SETUP	**List Setup:** Press the INCREMENT (+) key to print a label listing the current printer configuration. This selection is used to print a label that lists the current printer configuration information. (Same as the CANCEL Key Self Test on page 76.)
LIST ALL	**List All:** Press the INCREMENT (+) key to print a label listing all of the available fonts, bar codes, images, formats, and the current printer configuration. This selection is used to print a label that lists the five previous selections, as described.

Display Shows	Action/Explanation
INITIALIZE CARD	**Initialize Memory Card** **CAUTION:** Perform this operation only when it is necessary to erase all previously stored information from the optional memory card. Press the SETUP/EXIT key to bypass this function. 1. Press the INCREMENT (+) key to select "YES." If your printer is set to require a password, you are prompted to enter the password. Enter the password and then press the SELECT key. 2. The display asks "INITIALIZE CARD?". Press the INCREMENT (+) key to select "YES." 3. The front panel LCD asks "ARE YOU SURE?". 4. Press the INCREMENT (+) key "YES" to begin initialization. *or* Press the DECREMENT (–) key "NO" to cancel the request and return to the "INITIALIZE CARD" prompt. 5. Press the SETUP/EXIT key followed by the SELECT key. If initialization is still in process, the front panel display flashes back and forth between the two phrases "CHECKING B: MEMORY" and "PRINTER IDLE." When initialization is complete, the printer automatically exits the configuration mode and the front panel displays "PRINTER READY." **NOTE:** Depending on the amount of memory in the memory card, initialization may take up to five minutes to complete.
INIT FLASH MEM	**Initialize Flash Memory** **CAUTION:** Perform this operation only when it is necessary to erase all previously stored information from the FLASH memory. Press the SETUP/EXIT key to bypass this function. 1. Press the INCREMENT (+) key to select "YES." If your printer is set to require a password, you are prompted to enter the password. Enter the password and then press the SELECT key. 2. The display asks "INITIALIZE FLASH?". Press the INCREMENT (+) key to select "YES." 3. The front panel LCD asks "ARE YOU SURE?". 4. Press the INCREMENT (+) key "YES" to begin initialization. *or* Press the DECREMENT (–) key "NO" to cancel the request and return to the "INITIALIZE FLASH" prompt. 5. Press the SETUP/EXIT key followed by the SELECT key. If initialization is still in process, the front panel display flashes back and forth between the two phrases "CHECKING E: MEMORY" and "PRINTER IDLE." When initialization is complete, the printer automatically exits the configuration mode and the front panel displays "PRINTER READY." **NOTE:** Depending on the amount of free FLASH memory, initialization may take up to one minute to complete.

Media and Ribbon Sensor Calibration

Performing the manual calibration procedure resets the sensitivity of the sensors to detect the media and ribbon you are using more accurately. With the sensors at their new sensitivity, the printer then performs the manual calibration. Changing the type of ribbon and/or media may require resetting the sensitivity of the media and ribbon sensors.

Display Shows	Action/Explanation
SENSOR PROFILE	**Sensor Profile:** Press the INCREMENT (+) key to print a media sensor profile. See Figure 23. The media sensor profile may be used to troubleshoot registration problems that may be caused when the media sensor detects preprinted areas on the media or experiences difficulty in determining web location. If the sensitivity of the media and/or ribbon sensors MUST be adjusted, use the manual calibration procedure.
MANUAL CALIBRATION	**Manual Calibration:** Press the INCREMENT (+) key to start the calibration procedure. This procedure is used to reset the sensitivity of the media and ribbon sensors. The manual calibration is then performed.

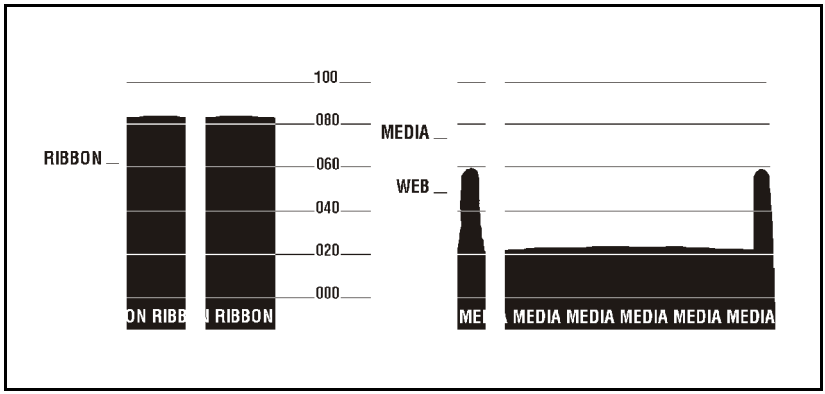


Figure 23

Setting Communication Parameters

Communication parameters must be set correctly for the printer to communicate with the host computer. These parameters make sure that the printer and host computer are "speaking the same language." All communication parameters are password protected.

Display Shows	Action/Explanation
SERIAL COMM	**Setting Serial Communications:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** RS-232 **Selections:** RS-232, RS-422/485, RS-485 multidrop Select the communications port that matches the one being used by the host computer.
BAUD	**Setting Baud:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** 9600 **Selections:** 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400 The baud setting of the printer must match the baud setting of the host computer for accurate communications to take place. Select the value that matches the one being used by the host computer.
DATA BITS	**Setting Data Bits:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** 7-bits **Selections:** 7-bits, 8-bits The data bits of the printer must match the data bits of the host computer for accurate communications to take place. Set the data bits to match the setting being used by the host computer. **NOTE:** Must be set to 8 data bits to use Code Page 850.

Display Shows	Action/Explanation
PARITY	**Setting Parity:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Even **Selections:** Even, odd, none The parity of the printer must match the parity of the host computer for accurate communications to take place. Select the parity that matches the one being used by the host computer.
HOST HANDSHAKE	**Setting Host Handshake:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** XON/XOFF **Selections:** XON/XOFF, DTR/DSR The handshake protocol of the printer must match the handshake protocol of the host computer for communications to take place. Select the handshake protocol that matches the one being used by the host computer.
PROTOCOL	**Setting Protocol:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** None **Selections:** None, Zebra, ACK_NACK Protocol is a type of error checking system. Depending on the selection, an indicator may be sent from the printer to the host computer signifying that data has been received. Select the protocol that is requested by the host computer. Further details on protocol can be found in the *ZPL II Programming Guide Volume I*. **NOTE:** Zebra is the same as ACK_NACK except that with Zebra the response messages are sequenced. **NOTE:** If Zebra is selected, printer must use DTR/DSR host handshake protocol.

Display Shows	Action/Explanation
NETWORK ID	**Setting Network ID:** Press the DECREMENT (–) key to move to the next digit position, press the INCREMENT (+) key to increase the value of the digit. **Default:** 000 **Range:** 000 - 999 Network ID is used to assign a unique number to a printer used in an RS-422/ RS-485 network. This gives the host computer the means to address a specific printer. If the printer is used in a network, you must select a network ID number. This does not affect TCP/IP or IPX networks.
COMMUNICATIONS	**Setting Communications Mode:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Normal mode **Selections:** Normal mode, diagnostics The communication diagnostics mode is a troubleshooting tool for checking the interconnection between the printer and the host computer. When “diagnostics” is selected, all data sent from the host computer to the printer is printed as straight ASCII hex characters. The printer prints all characters received including control codes, like CR (carriage return). A sample printout is shown in Figure 33 on page 79. **NOTES** on diagnostic printouts: • FE indicates a framing error. • OE indicates an overrun error. • PE indicates a parity error. • NE indicates noise. For any errors, check that your communication parameters are correct. Set the print width equal to or less than the label width used for the test. See page 42 for more information.